REMARKS/ARGUMENTS

After entry of the foregoing amendment, claims 1 and 5-21 will be pending in the application. Claims 1, 9, 14, and 20 are independent claims. No new matter has been added by the amendment.

The Claim Rejections

Claims 1, 5, 7-10, 12, and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,320,099 ("Roberts") in view of U.S. Patent No. 4,777,957 ("Wehrli"). Claims 6, 11, and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts in view of Wehrli, as applied above, and further in view of U.S. Patent No. 5,408,180 ("Mistretta").

The Cited References Do Not Render Any Claim Obvious

Applicant respectfully submits that the teachings of the cited references, taken as a whole, do not render the claimed invention obvious. Neither Roberts nor Wehrli teaches the application of amplitude modulated RF irradiation with a magnetic field gradient which, together, *mimic the effects of constant RF radiation unrelated to blood flow*, as recited in Applicant's claims.

Roberts discloses inversion of proton spins "by applying a off-resonance RF pulse in the presence of a constant magnetic field gradient" (Column 5, lines 10-12). Roberts further describes the production of an angiogram when an image taken during this inversion is subtracted from a control image without inversion using a "subtractive time-of-flight technique" (Column 5, line 5 and Column 21, lines 39-46).

The Examiner alleges that Roberts teaches one in the art to "[a]pply a second amplitude-modulated rf at 60 Hz (Column 15, lines 30-38), understood to mean applying rf

signals having periodic or intermittent amplitudes inversed rf and magnetic field gradient, which together would inherently mimic effects of constant RF radiation unrelated to blood flow, regardless of whether it is the intended effect (Column 22, lines 4-9)" (Office action at 2). Roberts, however, states: "The amplitude of the inversion pulse was 60 Hz and the amplitude of the inversion gradient was 0.2 gauss/cm" (col. 15, ll. 34-36). The Examiner further points to Roberts at col. 22, ll. 4-9, which is directed to "the step of changing a sign of a frequency offset of said tagging RF pulse" (col. 22, ll. 5-7). Applicant respectfully submits that Roberts does not teach or suggest amplitude modulated RF irradiation combined with a magnetic field gradient which, together, "mimic the effects of constant RF radiation unrelated to blood flow." Rather, Roberts discloses only a pulse with amplitude [*sic*, frequency] of 60 Hz.

None of the other cited references teach or suggest the claim limitation of "amplitude modulated RF irradiation with a magnetic field gradient which, together, mimic the effects of constant RF radiation unrelated to blood flow." Consequently, no combination of the cited references may properly be said to render the claimed invention obvious. Applicant respectfully submits, therefore, that the claimed invention patentably defines over the teachings of the cited references.

Further, the Examiner asserts that Wehrli teaches the determination of a time delay (Column 12, lines 30-35) and the waiting of a transit delay period before acquiring images (Column 2, line 1-49 and column 12, lines 1-35) in a method for measuring fluid flow. Applicant respectfully traverses the Examiner's assertion.

Wehrli discusses the determination of a time delay for acquisition of sequences designed to capture when arterial flow is slow in the cardiac cycle, which enhances the

signal, and when arterial flow is fast in the cardiac signal, which lowers arterial signal intensity (Column 2, lines 28-45). Applicant respectfully submits that this description of a time delay does not teach or suggest "determining a duration of the transit delay period so a to permit blood having perturbed arterial spins to flow into a tissue" or "determining a duration of the transit delay period so as to ensure that blood having perturbed arterial spins remains in a blood vessel of the sample." Thus, even with the combined teachings of Roberts and Wehrli, one skilled in the art would not be motivated to use the transit delay method disclosed by Wehrli to calculate the transit delay period as claimed.

CONCLUSION

For all the foregoing reasons, Applicant respectfully submits that the pending claims patentably define over the teachings of the cited references. A Notice of Allowance for claims 1 and 5-21 is respectfully requested. In the event, however, that the Examiner believes that the application is not allowable for any reason, the Examiner is encouraged to contact the undersigned attorney to discuss resolution of any remaining issues.

Date: August 1, 2003

Joseph R. Condo
Registration No. 42,431

Woodcock Washburn LLP
One Liberty Place - 46th Floor
Philadelphia PA 19103
Telephone: (215) 568-3100
Facsimile: (215) 568-3439